

1) A method storing data that is transmitted from a host to a flash memory via a bus, said method utilizing a cache memory that has banks of Magnetic Random Access Memory (MRAM), said flash memory being divided into

5 sectors said method comprising the steps of;

associating a bank of MRAM memory with a sector to which data has been transmitted,

temporarily storing data transmitted to said flash memory in said associated bank of MRAM memory, and

10 transmitting data from a MRAM memory bank to the associated sector in said flash memory when said MRAM memory bank has been filled to the capacity of said sector.

2) The method recited in claim 1 wherein there are less banks of MRAM

15 memory than there are sectors in said flash memory.

3) The method recited in claim 1 wherein said flash memory is NAND flash memory.

20 4) The method recited in claim 1 wherein said Flash memory and said MRAM memory are in a thumb drive.

5) The method recited in claim 1 wherein a MRAM data bank is disassociated from a sector in said flash memory when data from said MRAM bank is

25 transmitted to the associated sector in said flash memory.

6) The method in claim 1 wherein said bus is a Universal Serial Bus (USB).

7) The method in claim 1 wherein each MRAM memory bank is at least as

5 large as a sector in said flash memory.

8) A cache located between a bus and a flash memory, said bus transmitting

data faster than the rate at which data can be directly stored in said flash

memory, said flash memory being divided into sectors, said cache comprising;

10 a plurality of banks of Magnetic Random Access Memory (MRAM),

each bank having at least a capacity equal to the size of a sector in said flash

memory,

means for determining to which sector of said flash memory data is  
destined,

15 means for temporarily associating a bank of said MRAM with a sector

of said flash memory to which data is destined,

means which stores data received from said USB in the associated  
MRAM bank, and

means which transfers data from an MRAM memory bank to the  
20 associated sector of said flash memory when said MRAM memory bank is full.

9) The cache recited in claim 8 wherein said bus is a Universal Serial Bus

(USB).

10) The cache recited in claim 8 including an embedded processor that receives and decodes commands received from said serial bus.

11) The cache recited in claim 8 wherein said flash memory is NAND flash  
5 memory.

12) The cache recited in claim 8 wherein there are less banks of MRAM memory than there are sectors in said flash memory.

10 13) A thumb memory drive that includes the cache recited in claim 8.

14) The cache recited in claim 8 wherein a MRAM data bank is disassociated from a sector in said flash memory when data from said MRAM bank is transmitted to the associated sector in said flash memory.

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15) A method of operating a cache located between a Universal Serial Bus (USB) and a flash memory, said USB transmitting data faster than the rate at which data can be stored in said flash memory, said flash memory being divided into sectors, said cache comprising;

20 a plurality of banks of Magnetic Random Access Memory (MRAM), each bank having a size equal to at least the size of a sector in said flash memory,

said method comprising,

determining to which sector of said flash memory data is destined,

temporarily associating a bank of said MRAM with a sector of said flash memory to which data is destined,

temporarily storing data received from said USB in the associated MRAM bank, and

5           transferring data from an MRAM memory bank to the associated sector of said flash memory when said MRAM memory bank is filled with an amount of data equal to the size of said sector.

16) The method recited in claim 15 wherein there are less banks of MRAM

10          memory than there are sectors in said flash memory.

17) The method recited in claim 15 wherein said flash memory is NAND flash memory.

15          18) The method recited in claim 15 wherein said flash memory and said MRAM memory are in a thumb drive.

19) The method recited in claim 15 wherein a MRAM data bank is disassociated from a sector in said flash memory when data from said MRAM  
20          bank is transmitted to the associated sector in said flash memory.

20) The method recited in claim 15 wherein said cache does not lose any data if power to said cache is lost.